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DRAFT Table 1
Screening of Technologies and Process Options - Soils
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
SOILS				
No Action	No Action	Not Applicable	No Action	Required under CERCLA by NCP
Institutional Controls	Access Restriction	Land Use Control/Deed Restriction	Restriction of permissible use of the property to limit access/exposures to contaminated soils and to notify future property owners/users of the restriction in the form of legal documents (Deed Notices) filed with the Camden County Clerk's Office.	Potentially applicable where property owner(s) consent has been obtained.
		Fencing	Security fence to provide a physical barrier to restrict exposure to contaminated soils. Signage on fence would be used to notify persons of restriction.	Potentially applicable where property owner(s) consent has been obtained.
		Security Controls	Electronic security (e.g. cameras, alarms or similar) or personnel to identify security breaches.	Potentially applicable where property owner(s) consent has been obtained.
Containment	Capping/Cover	Soil Cap	Permeable constructed soil cover to provide physical barrier against exposure to contaminated soil.	Potentially Applicable
		Multilayer Impermeable Cap	Multilayer cap with impermeable layer(s) (i.e. geotextile, bentonite) to prevent physical access to soil and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
		Asphalt Cap	Asphalt layer to prevent physical access to soil and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
		Concrete Cap	Concrete layer to prevent physical access to soil and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
Excavation	Excavation	Excavation	Excavation of contaminated soil using mechanical equipment	Potentially Applicable. Site conditions such as access limitations, soil conditions (saturated soils/wetlands) may require special constructions methods and excavation techniques.
Dewatering	Construction Dewatering	Well Points, Sumps, Waterway Diversion	Well points and sumps installed to dewater excavation areas. Surface waterways (streams) can be temporarily diverted to dewater excavation and work areas.	Potentially Applicable
Disposal	Disposal	On-Site Disposal	Consolidation and disposal of excavated contaminated soil in a constructed secure consolidation cell on site.	Not Feasible. Sherwin Williams does not own or control the properties where consolidation and disposal would be implemented. Action would potentially restrict the reuse of the site.
		Off-Site Disposal	Transport and disposal of excavated soil at a permitted off-site disposal facility	Potentially Applicable
Treatment	In Situ Treatment	In Situ Stabilization	Use of chemical reagent to precipitate, immobilize and bind contaminants in soil matrix. Concurrent immobilization of arsenic, lead and other contaminants may be difficult. Permanence of treatment uncertain.	Potentially applicable to minimize partitioning of inorganic contaminants to groundwater. May not be effective for organic contaminants.

DRAFT Table 1
Screening of Technologies and Process Options - Soils
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
Treatment	In Situ Treatment	Phytoremediation	Use of plants to degrade or extract contaminants from soils or to limit infiltration of stormwater; applicable primarily to relatively low levels of contaminants and shallow (root zone) soils. Testing would be needed to evaluate potential phytotoxicity, identify plant types and evaluate performance.	Potentially applicable to specific areas of low level contamination or as a means of hydraulic control.
		In Situ Soil Flushing	Use of chemical extractants to flush contaminants from subsurface soils In Situ. Performance and time required is uncertain and test for remedial effectiveness would be required.	Not feasible based on site conditions. Construction of collection system not practical and/or technology would transfer contaminants from one matrix (soil) to another (groundwater).
		In Situ Oxidation/Reduction	Use of chemical oxidant to destroy/convert contaminants.	Not applicable to inorganic contaminants. Potentially applicable technology for organic (VOCs, SVOCs, PCBs) contaminants.
		Vitrification	Use of thermal technology to solidify soil and contaminants such that contaminants are immobilized and bounded in the soil matrix.	Not feasible based on cost (electrical) for the remedial technology. Dispersion of chemicals in soil matrix may not be complete. Action would potentially restrict the reuse of the site.
	Ex Situ Treatment	Stabilizations/Solidification	Use of chemical reagents to precipitate, immobilize and bind contaminants in soil matrix. Reagents can include cement, cement kiln dust, apatite, asphalt cement or similar.	Potentially Applicable
		Chemical Oxidation/Reduction	Use of chemical oxidants to destroy contaminants.	Not Applicable. Primary contaminants to be remediated will be inorganic constituents.
		Soil Washing	Removal of contamination from bulk soils based on physical (particle size) separation and/or chemical (surfactant) extraction. Separated contaminated fraction requires additional treatment and disposal.	Potentially Applicable
		Bioleaching	Use of biologically produced extractants to leach contaminants from soil.	Not Feasible. Limited published performance data.
		Phytoremediation	Use of plants to degrade or extract contaminants from soils; applicable primarily to relatively low levels of contaminants.	Not feasible for off-site treatment due to space requirements, contaminant concentrations and time required for treatment.
		Incineration	Destruction of contaminants at high temperature.	Not applicable to inorganic contaminants at the site.

DRAFT Table 2
Screening of Technologies and Process Options - Sediment
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
SEDIMENT				
No Action	No Action	Not Applicable	No Action	Required under CERCLA by NCP
Institutional Controls	Access Restriction	Deed Restriction	Legal documents and restrictions to limit access/exposures to contaminated sediments and to inform future property owners/users of the restrictions.	Potentially applicable to limited areas of the site where property owner(s) consent has been obtained.
		Water Body Use Restriction	Prohibitions against use of surface water, as well as recreation activities (swimming, boating, wading and fishing). Notifications may include signage regarding restrictions.	Potentially applicable where property owner(s) consent has been obtained. Applicability limited in open/public areas. Action would result in loss of public use of water way.
		Fencing	Security fence to provide a physical barrier to restrict exposure to contaminated soils. Signage on fence would be used to notify persons of restriction.	Potentially applicable where property owner(s) consent has been obtained. Applicability may be limited in open/public areas.
		Security Controls	Electronic security (e.g. cameras, alarms or similar) or personnel to identify security breaches.	Potentially applicable where property owner(s) consent has been obtained. Applicability may be limited in open/public areas.
	Monitoring	Monitoring	Periodic sampling and analysis of sediment to evaluate conditions.	Potentially Applicable
		Monitored Natural Recovery (MNR)	Use of natural processes (i.e. natural sedimentation) to form a barrier to contamination.	Potentially Applicable. Evaluation of ongoing MNR processes such as sediment deposition would be required.
Containment	In Situ Subaqueous Capping	Permeable Cap	Passive or active subaqueous barriers comprised of natural materials (e.g. sand, gravel, clay) and/or engineered materials or geomembrane/granular cover.	Not feasible without compensatory excavation due to shallow sediment depth and regulatory requirements.
		Impermeable Cap	Cap using impermeable layer (anchored by sand or gravel) to minimize migration of contaminated water through sediment.	Not feasible without compensatory excavation due to shallow depth of streams and regulatory requirements.
Excavation	Excavation	Excavation	Removal of sediment using mechanical equipment under dewatered scenario.	Potentially Applicable. Site conditions (access limitations and wetlands/saturated sediment conditions) may complicate excavation and required special construction methods.
		Dredging	Removal of sediment from water body (under water), using specialized mechanical equipment.	Potentially Applicable. Evaluation of the most effective method of sediment removal will be required.
Dewatering	Construction Dewatering	Channel Diversion/Bypass, Collection Sumps	Sheetpiling, temporary dams, bypass pumping, sumps or similar methods installed to facilitate dewatering of streams for dry excavation of sediment.	Potentially Applicable

DRAFT Table 2
Screening of Technologies and Process Options - Sediment
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
Disposal	Disposal	On Site Disposal	Consolidation and disposal of excavated sediment in a constructed secure consolidation cell on site.	Not Feasible. Sherwin Williams does not own or control the properties where consolidation and disposal would be implemented. Action would potentially restrict the reuse of the site.
		Off Site Disposal	Transport and disposal of excavated sediment at a permitted off-site disposal facility.	Potentially Applicable
Treatment	In Situ Treatment	Phytoremediation	Use of plants to degrade or extract contaminants from sediments.	Potentially applicable to specific areas of low level contamination. Feasibility and effectiveness unknown. Testing would be needed to evaluate potential phytotoxicity, identify plant types and evaluate performance.
		In Situ Sediment Flushing	Use of chemical extractants to flush contaminants from subsurface sediments In Situ. Performance and time required is uncertain and testing would be required.	Not feasible under site conditions. Not applicable to surficial sediments.
		In Situ Stabilization	Use of chemical reagent to precipitate, immobilize and bind contaminants in sediment matrix. Concurrent immobilization of arsenic, lead and other contaminants may be difficult. Performance of treatment uncertain.	Potentially applicable to minimize partitioning of contaminants to groundwater and surface water. May not be feasible due to regulatory requirements.
		In Situ Oxidation/Reduction	Use of chemical oxidant to destroy contaminants.	Not applicable. Primary contaminants to be addressed are inorganics.
	Ex Situ Treatment	Stabilization/Solidification	Use of chemical reagents to precipitate, immobilize and bind contaminants in soil matrix. Reagents can include cement, cement kiln dust, apatite, asphalt cement or similar.	Potentially Applicable
		Sediment Washing	Removal of contamination from bulk sediments based on physical (particle size) separation and/or chemical (surfactant) extraction. Separated contaminated fraction requires additional treatment and disposal.	Potentially Applicable
		Bioleaching	Use to biologically produce extractants to leach contaminants from sediments. Limited performance data.	Not Feasible
		Chemical Oxidation/Reduction	Use of chemical oxidants to destroy contaminants.	Not applicable. Primary contaminants to be addressed are inorganic.
		Incineration	Destruction of contaminants at high temperature.	Not applicable for inorganic contaminants.

DRAFT Table 3
Screening of Technologies and Process Options - Surface Water
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
SURFACE WATER				
No Action	No Action	Not Applicable	No Action	Required under CERCLA by NCP
Institutional Controls	Access Restriction	Deed Restriction	Legal documents and restrictions to limit access/exposures to contaminated water and to inform future property owners/users of the restrictions.	Potentially applicable where property owner(s) consent and NJDEP approval have been obtained.
		Water Use Restriction	Prohibitions against use of surface water, as well as recreation activities (swimming, boating, wading and fishing). Notifications may include signage regarding restrictions.	Potentially applicable where property owner(s) consent and NJDEP approval been obtained. Applicability limited in open/public areas. Action would result in loss of public use of water way.
	Monitoring	Surface Water Monitoring	Periodic sampling and analysis of surface water to evaluate conditions.	Potentially Applicable
	Alternate Water Supply	Municipal Water Supply	Connection of potable surface water users to an existing municipal/public supply.	Not Applicable. No current surface water users. Users are served by municipal supply or private potable wells.
		New Community Water Supply	Construction of a new water supply system for potable surface water users in a community.	Not Applicable. No current surface water users. Users are served by municipal supply or private potable wells.
		Bottled Water	Provision of bottled water to potable surface water users in a community.	Not Applicable. No current surface water users. Users are served by municipal supply or private potable wells.
Collection	Collection	Surface Water Diversion, Capture and Pumping	Surface water collection systems (dams, channels, piping or similar) installed to provide for collection of surface water via pumping.	Potentially applicable but not feasible. Potential negative impacts on wetlands, wildlife due to removal of surface water.
Treatment	Ex Situ Treatment	Ion Exchange	Use of ion exchange (activated alumina and specialty adsorbents) and related mechanisms to remove ionic constituents from water.	Potentially applicable but may be unfeasible due to the level of effort for construction of treatment facility and long term operation costs for collection, treatment and discharge of water. Ability to meet discharge criteria uncertain and pilot testing would be required.
		Membrane Technology	Use of membrane technology (e.g. reverse osmosis, electrodialysis or similar) to remove ionic inorganics from water.	Not feasible due to the level of effort for construction of treatment facility and long term operation costs for collection, treatment and discharge of water. Ability to meet discharge criteria uncertain and pilot testing would be required.

DRAFT Table 3
Screening of Technologies and Process Options - Surface Water
FMP Area, Sherwin-Williams Hilliards Creek Site
Gibbsboro, New Jersey

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
		Oxidation/Reduction, Precipitation/Coprecipitation	Chemical oxidation and/or chemical reduction to precipitate/coprecipitate constituents from water followed by filtration/separation for removal from water.	Potentially applicable but may be unfeasible due to the level of effort for construction of treatment facility and long term operation costs for collection, treatment and discharge of water. Ability to meet discharge criteria uncertain and pilot testing would be required.
Treatment	Ex Situ Treatment	Constructed Wetlands	Use of constructed wetlands to precipitate/adsorb and remove metals from the water to the plant tissue and plant root zone soils in the treatment area.	Likely not feasible on site since Sherwin Williams does not own or control the properties and possible space restrictions. Ability to meet discharge criteria uncertain and pilot testing would be required.
		Phytoremediation	Use of vegetation (grasses, shrubs, trees) in contained wetland cells to precipitate/adsorb and remove metals from the water to the plant tissue and plant root zone soils in the treatment area.	Likely not feasible on site since Sherwin Williams does not own or control the properties and possible space restrictions. Ability to meet discharge criteria uncertain and pilot testing would be required.
Disposal/Discharge	Discharge	Discharge to Publicly Owned Treatment Works (POTW)	Collected surface water discharged to local POTW following pretreatment as required to meet POTW acceptance criteria.	Potentially applicable but not feasible. Local POTW unlikely to accept large volume of surface water. Construction of conveyance system infeasible due to costs. Potential negative impacts on wetlands, wildlife due to removal of surface water.
		Surface Water Discharge by Surface or Subsurface Irrigation System	Surface water discharged to local groundwater using surface or subsurface irrigation systems after treatment to meet all applicable groundwater discharge criteria (presumably NJDEP GWQS).	Not Applicable. Discharge of large volume of surface water to groundwater not feasible.

DRAFT Table 4
Screening of Technologies and Process Options – LNAPL
FMP Area, Sherwin-Williams Hilliards Creek Site

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
LNAPL				
No Action	No Action	Not Applicable	No Action	Required under CERCLA by NCP
Institutional Controls	Access Restriction	Land Use Control/Deed Restriction	Restriction of permissible use of the property to limit access/exposures to contaminated soils and to notify future property owners/users of the restriction in the form of legal documents (Deed Notices) filed with the Camden County Clerk's Office.	Potentially applicable where property owner(s) consent has been obtained.
		Fencing	Security fence to provide a physical barrier to restrict exposure to contaminated soils. Signage on fence would be used to notify persons of restriction.	Potentially applicable where property owner(s) consent has been obtained.
		Security Controls	Electronic security (e.g. cameras, alarms or similar) or personnel to identify security breaches.	Potentially applicable where property owner(s) consent has been obtained.
Containment	Capping/Cover	Soil Cap	Permeable constructed soil cover to provide physical barrier against exposure to LNAPL.	Potentially Applicable
		Multilayer Impermeable Cap	Multilayer cap with impermeable layer(s) (i.e. geotextile, bentonite) to prevent physical access to soil and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
		Asphalt Cap	Asphalt layer to prevent physical access to LNAPL and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
		Concrete Cap	Concrete layer to prevent physical access to LNAPL and to minimize surface water infiltration to groundwater through soil.	Potentially Applicable
Excavation	Excavation	Excavation	Excavation of soil containing LNAPL using mechanical equipment	Potentially Applicable. Site conditions such as access limitations (presence of buildings and other structures), soil conditions (saturated soils/wetlands), and depth of contamination may require special constructions methods and excavation techniques, or prevent use of technology.
Disposal	Disposal	On-Site Disposal	Consolidation and disposal of excavated contaminated soil in a constructed secure consolidation cell on site.	Not feasible. Sherwin Williams does not own or control the properties where consolidation and disposal would be implemented. Action would potentially restrict the reuse of the site.
		Off-Site Disposal	Transport and disposal of excavated soil at a permitted off-site disposal facility	Potentially Applicable. Pre-treatment likely needed prior to transport.
Treatment	In Situ Treatment	In Situ Stabilization	Use of chemical reagent to stabilize bind LNAPL within a stabilized soil matrix to reduce mobility.	Potentially applicable to minimize dissolution of organic contaminants from LNAPL to groundwater. Treatability testing needed to determine efficacy. Presence of buildings and other access limitations may limit the ability to use the technology.

DRAFT Table 4
Screening of Technologies and Process Options – LNAPL
FMP Area, Sherwin-Williams Hilliards Creek Site

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
Treatment	In Situ Treatment	Phytoremediation	Use of plants to degrade or extract contaminants from soils or to limit infiltration of stormwater; applicable primarily to relatively low levels of contaminants and shallow (root zone) soils. Testing would be needed to evaluate potential phytotoxicity, identify plant types and evaluate performance.	Potentially applicable to specific areas of low level contamination or as a means of hydraulic control. Not applicable in areas where buildings, roadways and parking areas are present.
		In Situ Oxidation/Reduction	Use of chemical oxidant to destroy/convert contaminants.	Potentially applicable. Presence of buildings and other structures may prevent use of technology in those locations. Mass of LNAPL combined with natural oxidant demand may make use of technology infeasible. May interfere with anaerobic biodegradation currently active at site.
		Natural Source Zone Depletion	LNAPL is naturally depleted from the subsurface over time by volatilization, dissolution, absorption and degradation.	Potentially applicable. There is current evidence that natural source zone depletion is ongoing. Estimates of degradation rate are required.
		Biostimulation	Additional of soil and/or groundwater amendments to increase biomass and increase rate of biodegradation.	Potentially applicable. Soil and groundwater evaluation will be required to determine what amendments may be effective.
	Ex Situ Treatment	Stabilizations/Solidification	Use of chemical reagents to precipitate, immobilize and bind contaminants in soil matrix. Reagents can include cement, cement kiln dust, apatite, asphalt cement or similar.	Potentially applicable for any excavated soil containing LNAPL. Treatability studies will be needed to determine the most effective treatment reagent. Likely needed prior to off-site transport of soil containing LNAPL for disposal.
		Chemical Oxidation/Reduction	Use of chemical oxidants to destroy contaminants.	Potentially applicable to excavated soil containing LNAPL. However, since disposal of soil will likely be required after treatment, technology may not be feasible based on costs.
		Soil Washing	Removal of contamination from bulk soils based on physical (particle size) separation and/or chemical (surfactant) extraction. Separated contaminated fraction requires additional treatment and disposal.	Potentially applicable to excavated soil containing LNAPL. Treatability studies would be needed to determine applicable surfactant(s) and treatment for water/LNAPL produced by washing. Soil will likely be disposed of after treatment, so technology may not be feasible based on cost. A large dedicated area for soil staging and washing would be required to support the technology.
		Phytoremediation	Use of plants to degrade or extract contaminants from soils; applicable primarily to relatively low levels of contaminants.	Not applicable. A large area would be required, as would an extended treatment time period, and other methods of treating excavated soil would be preferred.

DRAFT Table 4
Screening of Technologies and Process Options – LNAPL
FMP Area, Sherwin-Williams Hilliards Creek Site

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
		Low Temperature Thermal Desorption	Use of heat to remove volatile constituents from soil. Vapors would be collected or treated. Soil would be disposed of or reused.	Potentially applicable to excavated soil containing LNAPL. However, costs, permitting requirements and the need for a dedicated treatment area may make the technology infeasible.
		Incineration	Destruction of contaminants at high temperature. Soil would be disposed of or reused.	Potentially applicable to excavated soil containing LNAPL. However, costs, permitting requirements and the need for a dedicated treatment area (if conducted on-Site) may make the technology infeasible.
LNAPL Recovery	LNAPL Removal	Manual Recovery	Accumulated LNAPL is removed from wells using bailers, pumps or vacuum trucks.	Potentially applicable in those locations where recoverable LNAPL is present. Use of technology may be limited where residual saturations are low.
		LNAPL Skimming	LNAPL is hydraulically recovered from the top of the groundwater column within a well.	Potentially applicable in those locations where recoverable LNAPL is present. Use of technology may be limited where residual saturations are low.
		Bioslurping	LNAPL is removed by a combination of vacuum-enhanced recovery and bioventing.	Potentially applicable. Operation and maintenance requires adjustment of drop tubes to account for groundwater fluctuations, so use of technology may be limited by the presence of buildings or high traffic areas. Residual LNAPL will remain after application of technology.
		Dual (or multi-) Phase Extraction	Groundwater is extracted to reduce the water table and remove the hydraulic forces containing trapped LNAPL, and the accumulated LNAPL is removed at the same location. Vapor extraction may also be implemented.	Potentially applicable. Pumping tests needed to estimate groundwater extraction rates to achieve drawdown; very deep LNAPL will remain inaccessible. Dedicated groundwater treatment plant will be required. Presence of buildings may limit the use of the technology. Residual LNAPL will remain after application of technology.
	LNAPL Stripping/Flushing	Air Sparging	Air is injected into subsurface to volatilize the LNAPL.	Potentially applicable. Likely needs to be accompanied by vapor extraction to collect vapors generated by air sparging. Air sparging effectiveness limited by the presence of lower permeability zones. Only volatile fraction will be removed. Residual LNAPL will remain after application of technology. Need to collect/treat vapors may make technology economically infeasible.

DRAFT Table 4
Screening of Technologies and Process Options – LNAPL
FMP Area, Sherwin-Williams Hilliards Creek Site

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
		Surfactant-Enhanced Flushing	A surfactant is injected to increase LNAPL solubility and mobility. The LNAPL/surfactant/water mixture is then recovered and treated or disposed of.	Potentially applicable. Additional treatability studies needed to assess most effective surfactant, design recovery system and design treatment system(s). Residual LNAPL will remain after application of technology.
		Heat-Enhanced Recovery	Heat (steam, hot water, electricity) is applied to the LNAPL to reduce viscosity and enhance recovery. Used in conjunction with another recovery technology.	Potentially applicable. Residual LNAPL will remain following application of technology. Cost for energy may make technology economically infeasible.

DRAFT Table 5
Screening of Technologies and Process Options – Vapor Intrusion
FMP Area, Sherwin-Williams Hilliards Creek Site

General Response Action	Remedial Technology	Process Option	Description	Screening Comments
Vapor Intrusion				
No Action	No Action	Not Applicable	No Action	Required under CERCLA by NCP
Treatment	Biodegradation	Sub-Slab Ventilation	Air is circulated into the vadose zone beneath the building slab and parking lot to increase oxygen levels and initiate aerobic biodegradation of the methane.	Potentially applicable. Methane degrades rapidly in the presence of oxygen, so technology is likely to be effective. Testing is needed to support design. VOCs found in indoor air (benzene and naphthalene) are expected to biodegrade aerobically.
	Isolation	Sub-Slab Depressurization	Air is extracted from the vadose zone below the building slab to establish a pressure gradient that goes from the building into the vadose zone, preventing subsurface vapors from entering the building.	Potentially applicable. Sub-slab depressurization systems are established technologies for controlling vapor intrusion. May not, however, provide adequate mass reduction in the vadose zone to remove methane.
	Mass Removal	Soil Vapor Extraction	Air is extracted from the vadose zone beneath the building and parking area to remove the accumulated methane and VOCs. The captured vapors are treated to remove contaminants prior to discharge to the atmosphere.	Potentially applicable. Soil vapor extraction is an established technology for removing volatile organic compound from the subsurface. However, use of the technology may be limited by the presence of groundwater, which prevents extraction of vapors. Permitting may represent an implementation obstacle.